Attachment 2

ENGINE FAMILY INFORMATION FILE
Off-Road Large Spark-Ignition Engines

Sequence	Data Name	Type	Length	Range or Domain	Description
1	QTR	N	3	Example: 101=Jan-Mar 2001 201=Apr-Jun 2001 301=Jul-Sep 2001 401=Oct-Dec 2001	First Digit = Quarter Number Second and Third Digit = Last two digits of calendar year
2	ENGFAM	C	12	Example: 1XYZS.072ABC	12-digit engine family name used for certification
3	EO	C	11	Example: U-L-XX-XXX	Executive Order number
4	MFR	C	3	Example: XYZ	Three letter EPA designated ID code
5	MODELYR	N	4	Example: 2001	Model Year of engine family
6	SVM	C	1	Y = Yes, N = No	Small volume manufacturer
7	DISP	N	2.2	Example: 2.6	Engine displacement in liters
8	SAMPLOPT	C	3	CSM = Cumulative Sum method 1PT = 1% method ALT = Alternate method	Sampling method.
9	MAXPWR	N	3.2	Example: 43.10	Maximum power (hp) from certification
10	CERTFUEL	C	3	PH2= Phase 2 reformulated gasoline IND=Indolene CNG=Compressed Natural Gas LPG= Liquefied Petroleum Gas C&L= CNG & LPG G&L= Phase 2 gasoline & LPG G&C= Phase 2 gasoline & CNG GCL= Phase 2 gasoline, CNG & LPG	Engine family certified to use specific fuel
11	MULTIFUEL	C	1	F = Flex fuel D = Dual fuel N = Not applicable	Engine family is flex or dual fuel.
12	CARRYOVER	C	1	Y=Yes or N=No	Is engine family a carryover?
13	HCNOXSTD	N	1.1	Example: 3.0	Applicable HCNOx standard
14	COSTD	N	3.1	Example: 37.0	Applicable CO standard
15	DRBLTY	C	7	Number of hours/years or N/A Ex : 7 yr or 2000 hr	Durability period in hours and years or not applicable
16	HCNOXDF	N	1.3	Example: 1.394 (multiplicative) or 0.250 (additive)	HC+NOX deterioration factor
17	HNDF_TYPE	C	1	A = Additive M = Multiplicative	Is HCNOX deterioration factor additive or multiplicative
18	CODF	N	1.3	Example: 1.082 (multiplicative) or 0.250 (additive)	CO deterioration factor.
19	CODF_TYPE	C	1	A = Additive M = Multiplicative	Is CO deterioration factor additive or multiplicative
20	SLCTPROC	C	75	Example: Engines selected qtrly using random number generator	Description of random selection procedure for this engine family

ENGINE FAMILY DATA PER QUART

Off-Road Large Spark-Ignition En

Sequence	Data Name	Type	Length	Range or Domain
1	QTR	N	3	Example: 101 = Jan-Mar 2001
2	ENGFAM	C	12	Example: 1XYZS.072ABC
3	STARTUP	D	10	Example: July 20, 2000 = 2000/07/20 format: year/month/day
4	BUILDOUT	D	10	Example: July 20, 2001 = 2001/07/20 format: year/month/day
5	QTR PROD	N	7	Example: 700500 Range: 0 to 9999999
6	CADISTR	N	6	Example: 52500 Range: 0 to 999999
7	TLPROD	N	8	Example: 700500 Range: 0 to 99999999
8	QTRSAMP	N	2	ex. 5 Range: 0 to 99
9	TLSAMP	N	2	ex: 22
10	REQSAMP	N	2	Example: 8 Range: 0 to 30
11	TESTFUEL	C	3	Example: G&L
12	HCNOXMN	N	2.2	Example: 10.69
13	HCNOXSD	N	2.3	Range: 0.000 to 99.999
14	COMN	N	3.2	Example: 12.01
15	COSD	N	3.3	Range: 0.0 to 999.99
16	HCNOXCS	N	3.3	Range: 000.000 to 999.999
17	HCNOX_H	N	3.2	Range: 0.00 to 999.99 H Limit = 5 x (standard deviation)
18	COCS	N	3.3	Range: 0.000 to 999.999
19	CO_H	N	3.2	Range: 0.00 to 999.99 H Limit = 5 x (standard deviation)
20	COMPLY	C	6	CSFAIL = Cumsum: 2 sequential action limit exceedances 1%FAIL = Tests average exceeded standard. PASS = Compliant
21	TSTFCLTY	C	50	Example: CVS engine dyno in Milwaukee

INDIVIDUAL ENGINE TEST DATA PER QUARTER FILE

Off-Road Large Spark-Ignition Engines

Sequence	Data Name	Type	Length	Range or Domain	Description
1	QTR	N	3	Example: 101 = Jan-Mar 2001	First digit = calendar quarter number, second and third digits = last two digits of calendar year
2	ENGFAM	C	12	Example: 1XYZS.072ABC	12-digit engine family name used at certification
3	ENGCODE	C	15	ex. XY123456AB-1234	Manufacturer designated engine code or calibration number
4	ENGID	C	15	ex. AB1234XY5678	Manufacturer designated serial number or other unique identification number which identifies the configuration
5	MODEL	C	15	ex. ST400	Manufacturer designated engine/equipment model name or model number
6	MAKE	C	15	Name	Manufacturer designated make of the engine
7	DISP	N	2.2	Example: 1.0 liters	Engine displacement in liters
8	RATEDHP	N	3.2	ex. 33.15	Rated power of the test engine as certified [unit = horsepower (hp)]
9	OBSHP	N	3.2	ex. 33.00	Observed power of the test engine at 100% load [unit = horsepower (hp)]
10	RATEDSP	N	5	ex. 4000	Rated speed of the test engine model as certified [unit = revolutions per minute (rpm)]
11	TESTFUEL	C	3	IND = Indolene PH2 = Phase 2 gasoline CNG = Compressed natural gas LPG = Liquefied Perroleum gas	Test fuel
12	FUELSYS	C	4	CARB = Carburetor MIXR = Mixer TBI = Throttle body injection SFI = Sequential injection MFI = Multiport injection	Fuel system for the engine.
13	TESTPRC	C	1	G = Raw Gas V = CVS X = Other Test Procedure	Emission sampling test procedure used for testing this engine
14	PRODSTRT	D	10	ex. July 20, 2000 = 2000/07/20 format:yyyy/mm/dd	1st day of production for the batch from which the test engine was taken
15	PRODEND	D	10	ex. Dec. 12, 2000 = 2000/12/12 format: yyyy/mm/dd	Last day of production for the batch from which the test engine was taken
16	RUNIN	N	2.2	ex. 10.20 hours Range: 0 to 12 hours	Total break-in time accumulated by this engine prior to the audit test (including preconditioning)
17	RNINLOC	C	4	ex: MILW - Milwaukee plant	Location of service accumulation
18	RNINPROC	C	30		Description of service accumulation and schedule used
19	MFRPLANT	C	4	ex. MILW - Milwaukee plant	Abbreviated name/location of manufacturing plant
20	TESTLOC	C	4	ex. LA - Los Angeles Laboratory	Abbreviated name/location of test facility
21	BLDDATE	D	10	ex. January 12, 2000 = 2000/01/12 format: yyyy/mm/dd	Date when the engine/equipment was built **Date Format**
22	TESTDATE	D	10	ex. January 22, 2000 = 2000/01/22 format: yyyy/mm/dd	Date when the engine/equipment was tested - **Date Format**
23	TESTTIME	T	5	ex: 13:23	Test time of test facility **Time Format**
24	ADJSTMTS	C	50		Description of before test adjustments, modifications, repairs, preparation or testing not to be performed on all production engines
25	HC	N	2.3	ex. 15.97	HC test result for this engine without DFs [unit = (g/bhp-hr)]
26	NOX	N	2.3	ex. 2.520	NOx test result for this engine without DFs [unit = (g/bhp-hr)]
27	HCNOX	N	2.3	ex. 7.424	HC+NOx test result for this engine without DFs [unit = (g/bhp-hr)]

COMBINED QUARTERS ENGINE FAMILY FILE

Off-Road Large Spark-Ignition Engines

Where 1% Sample Option Used

Sequence	Data Name	Type	Length	Range or Domain	Description
1	QTR	N	3	Example: 101 = Jan-Mar 2001	First Digit = Quarter Number Second and Third Digit = Last two digits of calendar year
2	ENGFAM	C	12	Example: 1XYZS.072ABC	12-digit engine family name used at certification
3	CMQTRS	N	1	ex: 2 Range: 1 to 8	Number of quarters combined to obtain at least 10 tests
4	CMCADIS	N	5	ex: 1235	Sum of California production for the quarters combined to get at least 10 tests
5	CMPRDSZ	N	6	ex: 14233	Sum of total production for the quarters combined to get at least 10 tests
6	CMSMPSZ	N	4	ex: 15	Sum of total engines tested for the quarters combined to get at least 10 tests
7	CMHCNXMN	N	2.3	Example: 10.69	Cumulative HCNOx mean (in g/bhp-hr) with DFs applied, for quarters combined to get at least 10 tests
8	CMHCNXSD	N	2.3	Range: 0.000 to 99.999	Cumulative HCNOx standard deviation (in g/bhp-hr) with DFs applied, for quarters combined to get at least 10 tests
9	CMCOMN	N	3.3	Example: 12.01	Cumulative CO mean (in g/bhp-hr) with DFs applied, for quarters combined to get at least 10 tests
10	CMCOSD	N	3.3	Range: 0.0 to 999.99	Cumulative CO standard deviation (in g/bhp-hr) with DFs applied, for quarters combined to get at least 10 tests

HARD COPY FORMAT
COMBINED QUARTERS ENGINE FAMILY FILE

QTR	ENGFAM	CMQTRS	CMCADIS	CMPRDSZ	CMSMPSZ	CMHCNXMN	CMHCNXSD	CMCOMN	CMCOSD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

NUMBERS IN PARENTHESIS INDICATE THE CORRESPONDING FIELD SEQUENCE NUMBER FROM THE COMBINED QUARTERS ENGINE FAMILY FILE.

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CODE KEY FILE

Example of Key for Engine Identification Code

Code Type	Code	Description
ENGCODE	XXXXXXXX	Provide an index to decipher the engine code
ENGID	XXXXXXXXXXXX	Provide an index to decipher the engine identification (serial) number
MODEL	XXXXXXXXXXXXXXX	Provide an index to identify the engine/equipment application

Example of Key for Plant and Test Location Codes

Code Type	Code	Description
MFRPLANT	MILW	Manufacturing site in Milwaukee, Wisconsin
MFRPLANT	NASH	Manufacturing site in Nashville, Tennessee
TESTLOC	LA	Test Laboratory in Los Angeles, California

Example of Key for Repair and Test Problem Codes

Code Type	Code	Description
REPAIRS	RCAP	Reset limiter cap
REPAIRS	RSPL	Replaced spark plug
REPAIRS	SCRP	Engine scrapped
REPAIRS	RVAS	Replaced valve and machined valve seat
NOTES	FAIL	Emission exceeded standard(s)
NOTES	FIXD	Engine repaired and passed retest
NOTES	TCTH	Test cell temperature too high
NOTES	SSPL	Engine stalled due to spark plug failure
NOTES	SBVA	Engine stalled during break-in due to valve damage

Attachment 8 provides an example of a Code Key File. The Key for Engine Identification Codes, the Key for Plant and Test Location Codes and the Key for Repair and Test Problem Codes refer to the Individual Engine Test Data Per Quarter and explain the codes reported in the ENGCODE, ENGID, MODEL fields, the MFRPLANT, TESTLOC fields and the REPAIRS, NOTES fields respectively. The information in the Code Key File should be presented in tabular form; however, the exact format used is not critical and is therefore not specified. Since the Key for Engine Identification Codes does not change quarterly, this information may be reported in the first quarter report of each calendar year or as changes to the codes occur.

Attachment 9

Off-Road LSI Engine Manufacturer EPA designated ID code	
Manufacturer	*Code*
Ford Power Products	FMX
Fuji Industries Ltd.	FJX
Honda Motor Co., Ltd.	HNX
Impco Technologies	TJX
Isuzu Motors Ltd.	SZX
Mitsubishi Motors Corporation	MTX
Nissan Motor Co. , Ldt.	NSX
Suzuki Motor Co.	SKX
Toyota Motor Corporation	TYX

Sequence	Data Name	Type	Length	Range or Domain	Description
28	CO	N	3.3	ex. 189.41	CO test result for this engine without DFs [unit = (g/bhp-hr)]
29	HCNOX+DF	N	2.3	ex. 7.524	HC+NOx test result for this engine with DFs applied, as applicable [unit = (g/bhp-hr)]
30	CO+DF	N	3.3	ex: 105.345	CO test result for this engine with DFs applied, as applicable [unit = (g/bhp-hr)]
31	FAIL	C	1	Y = YES or N = No	Indicate if emission test failed applicable Standard
32	TESTSTAT	C	2	OK = useable test data AV = average of multiple tests RA = results to be averaged IN = invalid test AB = aborted test RT = retest of failed engine NT = not testable NR = not reasonably operative NS = not safe to test DT = would be damaged by test	Test status for this engine. "OK" and "AV" flags data used for evaluation. "RA" is used to identify multiple tests for the same engine to be averaged. Report the reason(s) for aborting, invalidating retesting or not testing in the NOTES field of the initial test record. Report repairs in the REPAIRS field of the engine retest record.
33	TESTNUM	N	2	Range: 1 to 99	Test number for the engine being tested
34	REPAIRS	C	40	ex. replaced spark plug or manufacturer designated repair code	Any repairs/adjustments/corrective measures performed on a failing engine. List specific components replaced or adjusted. Manufacturer may use repair codes explained in the Code Key File.
35	NOTES	C	50	ex. Test cell temperature too high Manufacturer designated test-problem code.	Any comments: reason(s) for aborting, invalidating, retesting or not testing. Any engine failure remedies or corrective actions. Manufacturer may use test-problem code explained in the Code Key File.
36	HCNOXCS	N	3.3	Range: 0.000 to 999.999	CumSum statistic for HCNOx for current test using test results with DFs applied, as applicable
37	HCNOX_H	N	3.2	Range: 0.00 to 999.99	Action Limit for HCNOX for current emission test
38	HCNOXEXC	C	1	Y = YES or N = No	Action limit exceedance for HCNOX
39	COCS	N	3.3	Range: 0.000 to 999.999	CumSum statistic for CO for current test using test results with DFs applied, as applicable
40	CO_H	N	3.2	Range: 0.00 to 999.99	Action Limit for CO for current emission test
41	COEXC	C	1	Y = YES or N = No	Action limit exceedance for CO
42	HCNOX_N	N	2	Range: 0 to 30	Sample size (N) calculated for cum sum procedure for HCNOX with DFs applied, as applicable
43	CO_N	N	2	Range: 0 to 30	Sample size (N) calculated for cum sum procedure for CO with DFs applied, as applicable

...TER FILE

...ngines

Description
First Digit = Calendar Quarter Number Second and Third Digit = Last two digits of calendar year
12-digit engine family name used at certification
Start date of production for this engine family. Report every quarter after start up.
Engine family build-out date; date of the end of the manufacturer's production. Leave blank until production ends
Total number of engines produced this quarter
Number of engines produced for CA this quarter
Total number of engines produced this model year for CA
Number of engines tested this quarter
Total number of engines tested for model year
Test sample required for cum sum (N calculation) for engine family for model year as of the end of the quarter.
Test fuels used this quarter for engine testing
HCNOx mean (in g/bhp-hr) with DFs applied, quarterly for 1% testing or accumulatively for cum sum rounded per ASTM E29-93a to one significant decimal place greater than the applicable standard.
HCNOx standard deviation (in g/bhp-hr) with DFs applied, quarterly for 1% testing or accumulatively for cum sum
CO mean (in g/bhp-hr) with DFs applied, quarterly for 1% testing or accumulatively for cum sum rounded per ASTM E29-93a to one significant decimal place greater than the applicable standard.
CO standard deviation (in g/bhp-hr) with DFs applied, quarterly for 1% testing or accumulatively for cum sum
CumSum statistic for HCNOx from final audit test for the quarter using engine test results with DFs applied, as applicable
Action Limit for HCNOx from final engine test for the quarter
CumSum statistic for CO from final audit test for the quarter using engine test results with DFs applied, as applicable
Action Limit for CO from final engine test for the quarter
Indicate if engine family is in compliance or is noncompliant as a result of testing this quarter
List location and description of all test facilities used by manufacturer for this engine family

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01/19/2001